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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,929	07/16/2003	Enrique Saldivar Guerra	CID001/1-US	8513

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Stephen S. Hodgson  
Patent Attorney  
2620 Albans Rd.  
Houston, TX 77005

EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/621,929

Applicant(s)

SALDIVAR GUERRA ET AL.

Examiner

Rip A. Lee

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 45-48 is/are allowed.
- 6) ☒ Claim(s) 1-22 and 24-44 is/are rejected.
- 7) ☒ Claim(s) 23 and 49-58 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This office action follows a response filed on June 5, 2006. Claims 1, 15-17, 20, 21, 23, 31, 32, 34- 38, 50, and 54 were amended. Claims 1-58 are pending.

#### *Claim Objections*

1. Claims 49, 50, 53, and 54 are objected to because of the following informalities: Please change “tubular-type reactor” with “tubular reactor.” In the context of polymerization reactors, the term “type” does not modify or qualify to a better degree the term “tubular.” The term “tubular-type reactor” is also relative term which renders the claim unclear because the term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Appropriate correction is required.
2. Claim 53 is objected to because of the following informalities: In step (b), it appears that “reaction mixture” should be replaced with “first intermediate.” See claim 49 for parallel claim construction. Appropriate correction is required.

#### *Claim Rejections - 35 USC § 103*

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1-22 and 24-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visger *et al.* (U.S. 6,531,547).

Visger *et al.* teaches a process for making block copolymers comprising a poly(vinyl aromatic) block and a poly(vinyl aromatic-*co*-acrylic) block, of which polystyrene/polystyrene-*co*-maleic anhydride is exemplary (examples 11-13). Copolymerizations are conducted in the presence of peroxide initiator and TEMPO-based (*i.e.*, HO-TEMPO) stable free radical at temperatures in the range of 80 ° to about 200 °C (col. 7, line 60). The weight ratio of vinyl

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aromatic monomer to acrylic monomer lies in the range of 20/1 to 1/20 (col. 9, line 3). The polydispersity of the inventive copolymers is consistently below 3.0. These working examples do not show copolymers having  $M_n$  of greater than 25,000. However, the inventors indicate that the process of the invention is conducted to provide copolymers having  $M_w$  of up to 250,000, and often up to 150,000, which would satisfy the lower  $M_n$  limit of the instant claims (col. 10, lines 7-10). One may achieve this by adding additional promoter and initiator to enable polymerization of the second block at an acceptable rate (col. 8, lines 64-67). Since the prior art discloses details for preparing polystyrene/polystyrene-*co*-maleic anhydride copolymers, it would have been obvious to one having ordinary skill in the art to arrive at the process of instant claims 1, 15, 17, 21, and 38 by following the teachings of Visger *et al.*

The subject matter of the remaining claims is also obvious over Visger *et al.* The weight ratio of styrene to acrylic monomer suitable for the inventive process lies in the range of about 20/1 to about 1/20 (col. 9, lines 1-4). The amount of stable free radical is typically 0.001 to 0.01 mole/mole monomer, the initiator is used in amount of about 0.01-2 wt %, based on total reactants, and the molar ratio of stable free radical to initiator is about 5/1 to 0.5/1 (col. 7, lines 26-30 and 51-58). It is maintained that one of ordinary skill in the art would have found it obvious to arrive at the subject matter of the instant claims 4, 19, 31, 34, 36, and 39-44 because these features are disclosed in Visger *et al.*

The prior art does not show use of solvent in the amounts prescribed in the instant claims for making styrene-maleic anhydride copolymers, however, other examples show use of solvent levels of 50 and 60 wt % (see examples 2 and 3). Furthermore, additional solvent is added to maintain viscosity, and clearly, the amount of solvent to be used is variable (see examples). Thus, one of ordinary skill in the art would have found it obvious to adjust the appropriate amount of solvent in order to achieve appropriate solution viscosity, and thereby arrive at the subject matter of the instant claims 24-30 and 33, and correspondingly, claims 3, 16, and 20. Regarding claim 22, the reaction is performed at elevated temperature in a resin kettle. As such, one of ordinary skill in the art would have found it obvious that the pressure above the reaction mixture is higher than the vapor pressure of the reaction mixture itself. Use of itaconic anhydride in place of maleic anhydride is disclosed in col. 6, line 6.

*Allowable Subject Matter*

5. As indicated in the previous office action, claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 45-48 remains allowed over the closest references, Tanaka *et al.* (U.S. 4,328,327) and Campbell *et al.* (U.S. 6,346,590). The general subject matter of claims 49-58 are novel over the cited references, however, due to claim objections (*vide supra*), the status of these claims has been marked "objected to" on the accompanying PTO-326.

Tanaka *et al.* discloses a continuous bulk polymerization process that is carried out in two stages using a vertical reactor followed by a single-shaft horizontal reactor. The process results in the formation of a uniform copolymer of styrene and maleic anhydride containing a substantially constant amount of maleic anhydride. In sharp contrast, copolymers of the instant invention are block copolymers containing a styrene block and a random styrene/maleic anhydride block. Therefore, the prior art does not teach the subject matter of claims 49-52. Tanaka *et al.* also fails to teach or render obvious the subject matter of claims 53-58.

Campbell *et al.* discloses an apparatus for producing polymers by free radical polymerization and condensation reaction. The reactor is comprised of a primary, continuous stirred tank reactor which is connected in series to a secondary tube reactor. The reference does not disclose use of this configuration to make the polymer of the instant claims. Since the polymer of the prior art is prepared by free radical and condensation means, it would not have been obvious to one having ordinary skill in the art to use this apparatus for making the polymers of the instant claims.

### *Response to Arguments*

7. The rejection of claims under 35 U.S.C. 102(e) as being anticipated by Visger *et al.* has been overcome by amendment.

Applicants submit that claims 1, 15, 17, 21, 31, and 38 recite single step processes, however, the term comprising in the claims does not exclude unrecited steps. Therefore, the claims may be directed to a single step process, but they are not limited to those containing a single step. During polymerization according to Visger *et al.*, styrene and acrylic monomer are introduced to the reactor in a second stage. The initiator and stable free radical from the styrene polymerization are still active, and consequently, styrene and acrylic monomer remain in the presence of initiator and free radical. Also, one of skill in the art would have found it obvious to add additional promoter and initiator to enable polymerization of the second block, as directed by Visger *et al.* (col. 8, lines 64-67). As such, the condition recited in the claims, is met.

8. The rejection of claims under 35 U.S.C. 102(b) as being anticipated by Park *et al.* (*J. Poly. Sci., Part A: Polym. Chem.*, 2000) has been overcome by amendment.

### *Conclusion*

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

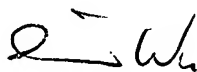
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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August 14, 2006

  
DAVID W. WU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700